

ABSTRACT OF THE DISCLOSURE

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A method of fabricating a semiconductor device is provided, which decreases the parasitic wiring capacitance among adjoining Cu-based wiring lines is provided and which prevents the oxidation of Cu-based wiring lines and the diffusion of the Cu atoms existing in the wiring lines. This method comprises the steps of (a) forming a first dielectric layer over a surface of a substrate; (c) forming a trench in the first dielectric layer; (d) covering an inner surface of the trench with a first nitride of refractory metal; (e) forming a Cu-based conductor on the first nitride of refractory metal in the trench; (f) covering a top surface of the conductor in the trench with a second nitride of refractory metal; (g) polishing the first dielectric layer until a polished surface of the first dielectric layer is approximately in a same level as a surface of the second nitride of refractory metal that covers the top surface of the conductor in the trench; and (h) forming a second dielectric layer on the polished surface of the first dielectric layer to cover the surface of the second nitride of refractory metal in the trench. The Cu-based conductor is entirely covered with the first nitride of refractory metal and the second nitride of refractory metal in the trench. The conductor, the first nitride of refractory metal, and the second nitride of refractory metal constitute a Cu-based wiring line.